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REMARKS

Claims 1-40 are pending in the present application. Claims 14-17 and 26 are withdrawn from consideration subsequent to Applicants' election of species:

the methacrylate group for the poly(arylene ether) functionalizing group;

ethoxylated bisphenol A dimethacrylate for the unsaturated monomer; and

4-t-butylcatechol for the inhibitor.

In the Listing of the Claims provided herewith, Applicants have included for original claims 33-40 status identifiers that were missing for these claims in the Listing of the Claims accompanying the Response filed March 25, 2005.

Reconsideration and allowance of claims 1-13, 18-25, 27-40 is respectfully requested in view of the following remarks.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-13, 21, 27-31, 34, 37 and 40 were rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Ishii et al. (US 6,835,786) in view of the ordinary skill in the art. Applicants respectfully traverse this rejection.

The Office Action stated that Ishii et al. produce methacrylated PPE oligomers and that unsaturated compounds and initiators, fused silica and polymerization inhibitors may be included. The Office Action stated that Ishii et al. do not, however, specify amounts of the initiator and inhibitor, but that the *claimed amounts appear to be conventional and that it would have been within the ordinary skill of the art to identify appropriate levels of initiator/inhibitor through routine experimentation*. (emphasis added).

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

The Examiner has stated, without citation of an authority, that the "claimed amounts [of initiator and inhibitor] appear to be conventional". Applicants request, pursuant to MPEP §2144.03, that the Examiner provide a citation documenting the unsupported assertion that the ranges for the amounts of initiator and inhibitor comprising the claimed curable composition were conventional within the art at the time of the invention.

Applicants note that independent claim 1 recites the following limitations with respect to the curing initiator and the curing inhibitor:

> about 0.2 to about 5 part by weight of a curing initiator per 100 parts by weight total of the functionalized poly(arylene ether) and the olefinically unsaturated monomer; and
>
> about 0.005 to about 1 part by weight of a curing inhibitor per 100 parts by weight total of the functionalized poly(arylene ether) and the olefinically unsaturated monomer;
>
> *wherein the weight ratio of the curing initiator to the curing inhibitor is about 1.2:1 to about 50:1.* (emphasis added)

Note that the claim comprises a "weight ratio of the curing initiator to the curing inhibitor is about 1.2:1 to about 50:1". Independent claim 40 also recites that the weight ratio of the curing initiator to the curing inhibitor is about 1.2:1 to about 50:1.

The Office Action stated that it would have been "within the ordinary skill of the art to identify appropriate levels of initiator/inhibitor through routine experimentation". Even if the claimed ranges of curing initiator and curing inhibitor are "conventional" as asserted by the Examiner, the range of weight ratios for the curing initiator:curing inhibitor that might theoretically be included in the curable composition based on the claimed amounts range from 0.2:1 to 1000:1. This theoretical range of weight ratio for curing initiator:curing inhibitor is much larger than the range of about 1.2:1 to about 50:1 recited in independent claims 1 and 40. Applicants cannot find any statement in Ishii et al., and know of none in the art, that teaches or suggests using only a limited range of weight ratio of the curing initiator to the curing inhibitor in the Ishii et al. composition or of optimizing the range of this parameter to "appropriate levels". Therefore, since all elements of the invention of independent claims 1 and 40 are not disclosed in Ishii et al. or elsewhere in the art, Applicants assert that a *prima facie* case of obviousness has not been established for Claims 1-13, 21, 27-31, 34, 37 and 40.

Further, Applicants cannot find any statement in Ishii et al., and know of none in the art, that would provide motivation for changing the disclosed curable resin composition of Ishii et al. to include the limitation on the weight ratio of the curing initiator to the curing inhibitor recited in Applicants' independent claims 1 and 40. Absent motivation to change Ishii et al. to include the limitation on the weight ration of the curing initiator to the curing inhibitor, no *prima facie* case of obviousness has been established for Claims 1-13, 21, 27-31, 34, 37 and 40.

Even if a *prima facie* case of obviousness were conceded, which it is not, it is respectfully submitted that Applicants' invention is not obvious because the particular combination of claimed elements results in unexpectedly beneficial properties. An applicant can rebut a *prima facie* case of obviousness by presenting comparative test data showing that the claimed invention possesses unexpectedly improved properties or properties that the prior art does not have. *In re Dillon*, 919 F.2d 688, 692-93, 16 U.S.P.Q.2d 1987, 1901 (Fed. Cir. 1990).

Applicants assert that the claimed amounts of curing initiator and curing inhibitor at the claimed weight ratios provide unexpectedly improved properties to the curable composition of the invention, as shown in the Examples provided in the application. Table 1 (p.25) shows for compositions with identical resin concentrations and identical amounts of curing initiator at a given curing temperature, that samples (Examples 1 and 2) with added curing initiator in a claimed amount and at a claimed weight ratio of curing initiator to curing inhibitor exhibit a more desirable balance of time at low viscosity (allowing flow within the mold as curing begins), time to maximum curing rate, and time to nearly complete curing (allowing rapid molding cycle times) than does a sample with no curing inhibitor (Comparative Example 1). Note, for example, that at a curing temperature of 147°C, Example 1 (weight ratio of curing initiator:curing inhibitor = 9.7) had a time to minimum ion viscosity of 33.25 sec, a time to maximum cure rate of 66.42 sec and time to the end of curing of 93.63 sec, while for these same parameters Comparative Ex. 1 had times of 11.64, 28.32, and 44.91 sec, respectively. Comparative Example 1 cured too quickly to allow good flow in the mold. This desirable balance is demonstrated further in the other examples, such as the representative experiments summarized in Table 4 (pp. 32-33). In Table 4, samples with curing initiator at claimed amounts but with no curing inhibitor resulted in gelling of the sample before the experiment could be initiated in the instrument (C. Exs. 8, 9 and 12), while samples with curing inhibitor but with no curing initiator (C. Exs. 10 and 11) failed to

cure during the 200 sec experimental time span. Inventive samples showed a desirable combination of time at low viscosity (CP2) and time to nearly complete curing. Additionally, spiral flow may be used as one measure of potential flow during molding. Table 2 (p.27) shows, for four samples with approximately equal amounts of resin and various amounts of curing initiator, the effect of adding a claimed amount of curing inhibitor at a claimed weight ratio of curing initiator:curing inhibitor on the measured spiral flow. Adding curing initiator to the resin decreases spiral flow relative to that measured in the absence of curing initiator (C. Exs. 5 and 6 vs. C. ex 7), however inclusion of curing initiator and curing inhibitor in amounts and at a weight ratio as per the claimed invention results in a significantly lengthened spiral flow (Ex 3 vs. C. Exs. 5, 6 and 7).

Thus, based on the unexpectedly superior results observed for the claimed curable compositions summarized in the examples of the application, Applicants assert that the claimed invention is not obvious over Ishii et al. in view of the ordinary skill in the art.

For all the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of Claims 1-13, 21, 27-31, 34, 37 and 40 over Ishii et al. in view of the ordinary skill in the art.

Claims 1-13, 21-25, 27-31, 34, 37 and 40 were rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over Ishii et al. in view of Kagaya et al. (US 5,102,605). Applicants respectfully traverse this rejection.

The Office Action stated that Ishii et al. produce methacrylated PPE oligomers and that unsaturated compounds and initiators, fused silica and polymerization inhibitors may be included, however Ishii et al. do not specify initiator and inhibitor levels in their composition. The Office Action further stated that Kagaya et al. teach butylcatechol inhibitors at 0.0001-0.1 pph and initiators at 0.1-4 pph for similar compositions of acrylated oligomer and unsaturated monomer and that it "would have been obvious to utilize inhibitor and initiator in the conventional amounts in the Ishii composition for the *expected* results". (emphasis added)

Applicants assert that the record does not appear to establish the requisite motivation for combining Ishii et al. and Kagaya et al. Applicants note that, as per MPEP §2141, the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed

invention. Applicants are unclear as to which results the examiner is alluding to as being "expected".

Applicants note that Kagaya et al. teach using curing initiators and curing inhibitors in compositions that are *polyesters*, not in the *polyphenylene ether* compositions taught by Ishii et al. The Office Action does not provide any motivation to combine the teachings of Kagaya et al. regarding curing initiators and inhibitors for polyester compositions to the different polyphenylene ether compositions of Ishii et al. Absent motivation to combine these teachings concerning disparate compositions, no *prima facie* case of obviousness has been established for independent claims 1 and 40 over Ishii et al. in view of Kagaya et al.

Additionally, as noted above, Applicants' independent claims 1 and 40 recite that the "weight ratio of the curing initiator to the curing inhibitor is about 1.2:1 to about 50:1". The ranges for the amounts of inhibitor and initiator disclosed by Kagaya et al. provide potential weight ratios of initiator to inhibitor for the curable composition ranging from 1:1 to 40,000:1, substantially larger than the range recited in independent claims 1 and 40. Neither Ishii et al. nor Kagaya et al. provide any motivation to limit the curing initiator:curing inhibitor weight ratio in the curable composition of Ishii et al. to any limited range of the potential weight ratios let alone the range recited in Applicants' independent claims 1 and 40 of about 1.2:1 to about 50:1. Applicants can find no statement in either Ishii et al. or Kagaya et al. that teaches or suggests that changing the curable composition of Ishii et al. by using the ranges of initiator and inhibitor disclosed by Kagaya et al. in a particular weight ratio of the curing initiator to the curing inhibitor would provide the curable composition with any desirable properties that would motivate experimentally determining the recited limited range for weight ratio. Absent such motivation, no *prima facie* case of obviousness has been established for independent claims 1 and 40 over Ishii et al. in view of Kagaya et al. Consequently, the Office Action has failed to establish a *prima facie* case of obviousness of claims 1-13, 21-25, 27-31, 34, 37 and 40 over Ishii et al. in view of Kagaya et al.

Further, Applicants cannot find any statement in Ishii et al. or in Kagaya et al., and know of none in the art, that teaches or suggests using only a limited range of weight ratio of the curing initiator to the curing inhibitor in the Ishii et al. polyphenylene ether composition as recited in independent claims 1 and 40. Therefore, since all elements of the invention of independent

claims 1 and 40 are not disclosed in the cited references, or elsewhere in the art, Applicants assert that a *prima facie* case of obviousness of Claims 1-13, 21-25, 27-31, 34, 37 and 40 over Ishii et al. in view of Kagaya et al. has not been established.

Additionally, even if a *prima facie* case of obviousness of claims 1-13, 21-25, 27-31, 34, 37 and 40 over Ishii et al. in view of Kagaya et al. were conceded, which it is not, it is respectfully submitted that Applicants' invention is not obvious because the particular combination of claimed elements results in unexpectedly beneficial properties with respect to increased flow during the early stages of curing without sacrificing overall curing times.

As discussed above, Applicants observed unexpectedly superior results for curable compositions with the claimed amounts of curing initiator and curing inhibitor at the claimed weight ratios that are summarized in the examples of the application. Applicants therefore assert that the invention of claims 1-13, 21-25, 27-31, 34, 37 and 40 is not obvious over Ishii et al. in view of Kagaya et al.

For all the foregoing reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-13, 21-25, 27-31, 34, 37 and 40 over Ishii et al. in view of Kagaya et al.

Claims 1-13, 18-23, 27-31, 34, 37 and 40 were rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Yeager et al. (US 6,352,782) or Zarnoch et al. (US 2002/0173597) in view of Ishii et al. Applicants respectfully traverse this rejection.

The Office Action stated that Yeager et al. and Zarnoch et al. both exemplify blends of methacrylate capped PPE, unsaturated monomer and peroxide in Applicants' amounts and that although additives in general are suggested, these documents lack a suggestion of inhibitors and that Ishii et al. suggest inhibitors can be added to methacrylate capped PPO compositions. The Office Action further stated that "Inhibitors would be expected to increase storability and lengthen cure time" and that it "would have been obvious to include an inhibitor in the Yeager/Zarnoch compositions for these advantages".

Applicants assert that a *prima facie* case of obviousness has not been established. As noted previously, Applicants' independent claims 1 and 40 stipulate ranges for the amounts of curing initiator and the curing inhibitor as well as ranges for the weight ratio of the curing

initiator to the curing inhibitor. Applicants can find no ranges for amounts of the curing inhibitor or for the weight ratio of the curing initiator to the curing inhibitor in Yeager et al., Zarnoch et al., or Ishii et al. Therefore, since all elements of the invention of independent claims 1 and 40 are not disclosed in the cited references, Applicants assert that a *prima facie* case of obviousness has not been established for Claims 1-13, 18-23, 27-31, 34, 37 and 40.

The Office Action further stated that addition of inhibitors, as suggested by Ishii et al., would be motivated by the expectation that the inhibitor would increase storability and lengthen cure time of the curable composition. Applicants note that such motivation, to lengthen cure time of the curable composition, teaches away from the instant invention recited in independent claims 1 and 40 in which the recited range of weight ratios for curing initiator:curing inhibitor was selected for increasing early stage flow *without* increasing overall curing time. Ishii et al. may provide motivation to add inhibitor to *lengthen* curing time and storability, but Applicants can find no statement in Ishii et al., Yeager et al. or Zarnoch et al. that teaches or suggests any motivation to select weight ratios of curing initiator:curing inhibitor that would not increase cure time while providing another desirable property. In the absence of such motivation, no *prima facie* case of obviousness has been established for claims 1-13, 18-23, 27-31, 34, 37 and 40.

Further, even if a *prima facie* case of obviousness of claims 1-13, 18-23, 27-31, 34, 37 and 40 over Yeager et al. or Zarnoch et al. in view of Ishii et al. were conceded, which it is not, it is respectfully submitted that Applicants' invention is not obvious because the particular combination of claimed elements results in unexpectedly beneficial properties with respect to increased flow during the early stages of curing without sacrificing overall curing times, as discussed above and as summarized in the examples of the application. Applicants therefore assert that the invention of claims 1-13, 18-23, 27-31, 34, 37 and 40 is not obvious over Yeager et al. or Zarnoch et al. in view of Ishii et al.

For all the above reasons, Applicants therefore respectfully request reconsideration and withdrawal of the rejection of claims 1-13, 18-23, 27-31, 34, 37 and 40 over Yeager et al. or Zarnoch et al. in view of Ishii et al.

Claims 1-13, 18-25, 27-40 were rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Yeager et al. or Zarnoch et al. in view of Harada et al. (US 3,656,980)

optionally in further view of Kagaya et al. Applicants respectfully traverse this rejection.

The Office Action stated that Yeager et al. and Zarnoch et al. each exemplify blends of methacrylate capped PPE, unsaturated monomer and peroxide in Applicants' amounts and that although antioxidants are suggested, these documents lack a suggestion of specific species. The Office Action stated that Harada et al teach that butylcatechol functions as a polymerization inhibitor and an antioxidant and that "it would have been obvious to include butylcatechol in the Yeager/Zarnoch compositions for either of these purposes". The Office Action stated further, that Kagaya et al. teach typical amounts of butylcatechol when present as an inhibitor.

Applicants assert that a *prima facie* case of obviousness has not been established. Applicants' independent claims 1, 32, 33 and 40 stipulate ranges for the curing initiator and the curing inhibitor as well as *ranges for the weight ratio of the curing initiator to the curing inhibitor*. In independent claims 1, 32 and 40 the recited weight ratio of the curing initiator to the curing inhibitor is about 1.2:1 to about 50:1, while in independent claim 33 the recited weight ratio of the curing initiator to the curing inhibitor is about 2:1 to about 20:1. Applicants note that they are unable to find, in any of the cited references, any statements that teach or suggest using the peroxide and the butylcatechol in the range of weight ratios for curing initiator:curing inhibitor recited in Applicants' independent claims 1, 32, 33 or 40. As noted above, the ranges for the amounts of an inhibitor such as butylcatechol and an initiator, such as peroxide, disclosed by Kagaya et al. provide potential weight ratios of initiator to inhibitor for the curable composition ranging from 1:1 to 40,000:1, a substantially larger range than the range of about 1.2:1 to about 50:1 recited in claims 1, 32 and 40, or the yet more limited range of about 2:1 to about 20:1 recited in independent claim 33. Therefore, since all elements of the invention of independent claims 1, 32, 33 and 40 are not disclosed in the cited references, Applicants assert that a *prima facie* case of obviousness has not been established for Claims 1-13, 18-25, 27-40.

Further, Applicants are unable to find in Yeager et al., Zarnoch et al., Harada et al., or Kagaya et al. any motivation to limit the curing initiator:curing inhibitor weight ratio in the curable composition of Yeager et al. or Zarnoch et al. to any limited range of the potential weight ratios possible with the amounts of Kagaya et al., let alone the ranges recited in Applicants' independent claims 1, 32, 33 or 40. Applicants can find no statement in Yeager et al., Zarnoch et al., Harada et al., or Kagaya et al. that recognizes, teaches or suggests that changing the curable

composition of Yeager et al. or Zarnoch et al. by using Applicants' amount of peroxide and the amounts for the inhibitor butylcatechol disclosed by Kagaya et al. in only a limited weight ratio of the curing initiator to the curing inhibitor would provide the curable composition with any desirable properties that would motivate experimentally determining such a range of weight ratio. Absent such motivation to combine the teachings of the cited references, no *prima facie* case of obviousness of claims 1-13, 18-25, and 27- 40 over Yeager et al. or Zarnoch et al. in view of Harada and optionally in view of Kagaya et al. has been established.

Additionally, even if a *prima facie* case of obviousness of claims1-13, 18-25, and 27- 40 over Yeager et al. or Zarnoch et al. in view of Harada and optionally in view of Kagaya et al. were conceded, which it is not, it is respectfully submitted that Applicants' invention is not obvious because the particular combination of claimed elements results in unexpectedly beneficial properties with respect to increased flow during the early stages of curing without sacrificing overall curing times as discussed above, and as summarized in the examples of the application. Applicants therefore assert that the invention of claims1-13, 18-25, and 27- 40 is not obvious over Yeager et al. or Zarnoch et al. in view of Ishii et al.

For all the foregoing reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-13, 18-25, and 27- 40 over Yeager et al. or Zarnoch et al. in view of Harada and optionally in view of Kagaya et al.

Provisional obviousness-type double patenting rejections

Claims 1-13, 18-25, 27-40 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-51 of co-pending application No. 10/678243. The Office Action stated that the conflicting claims are not identical, but are not patentably distinct from each other because the copending application also claims methacrylate capped PPE (claim 42), unsaturated monomer and inhibitor (claim 39).

Applicants thank the Examiner for pointing out the potential obviousness-type double patenting issue between the claims of the present application and those of co-pending application No. 10/678243. However, Applicants will defer responding to this provisional rejection until claims are allowed and it is determined whether this provisional rejection becomes an actual double-patenting rejection.

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Claims 1-13, 18-25, 27-40 were also provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-51 of co-pending application No. 10/920744. The Office Action stated that the conflicting claims are not identical, but are not patentably distinct from each other because the copending application also claims methacrylate capped PPE (claim 5), unsaturated monomer and inhibitor (claim 26).

Again, Applicants thank the Examiner for pointing out the potential obviousness-type double patenting issue between the claims of the present application and those of co-pending application No. 10/920744, but Applicants will defer responding to this provisional rejection until claims are allowed and it is determined whether this provisional rejection becomes an actual rejection.

It is believed that the foregoing remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

If there are any additional charges with respect to this Response or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,

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